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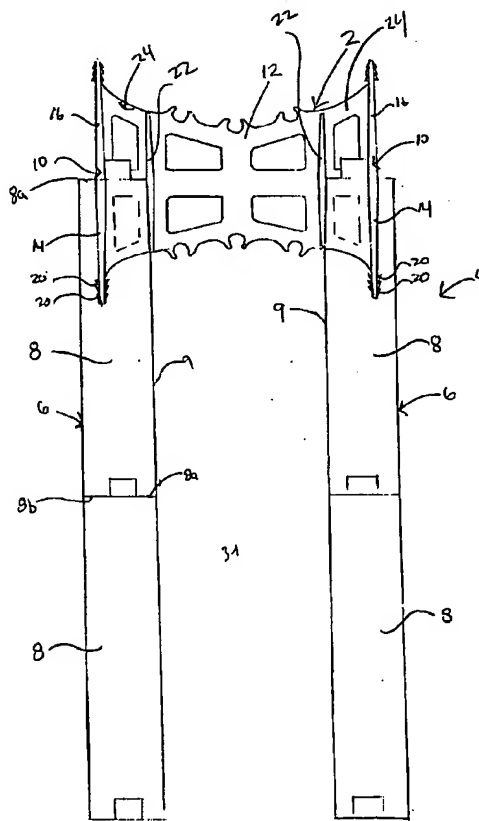
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(54) **IMBRICATIONS DE MUR EN BETON ET DES CONNECTEURS  
DE CEUX-CI**

(54) **CONCRETE WALL FORMWORK AND CONNECTORS  
THEREFOR**



**CONCRETE WALL FORMWORK AND CONNECTORS THEREFOR****FIELD OF THE INVENTION**

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The present invention relates generally to concrete-wall formwork comprising a pair of sidewalls each formed of a plurality of stacked rows of foam panels. More particularly, it relates to connectors used to maintain said sidewalls in spaced and parallel relationship.

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**BACKGROUND OF THE INVENTION**

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A number of different systems and method currently exist for making insulating formworks for casting a concrete wall. The side-walls of isolating formworks are generally made of a rigid foam like polystyrene.

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Known formworks with the desirable rigidity are prepared in the factory and have to be transported and installed onto the ground to be treated with the inherent risk of damage during transportation or installation. Particularly, since preassembled formworks are fragile due to the important empty volume existing between the isolating walls.

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In other conventional methods, formworks satisfying the requirements of rigidity are installed on the site, however they are complex and expensive, since the numerous components of the latter formworks render assembly time consuming.

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Simplified and less expensive systems have recently be proposed, however, those systems with a fragile anchorage inside the panels, do not exhibit a satisfying rigidity when assembled at the site.

## SUMMARY OF THE INVENTION

An object of the present invention is to propose a foam concrete form and more particularly, connectors therefor which overcome the drawbacks of the presently available methods and apparatus for making concrete-wall formwork.

In accordance with the present invention, that object is achieved with a connector for use with a concrete-wall formwork of the type comprising a pair of formwork sidewalls, each formed of a plurality of stacked horizontal rows of coplanar substantially rectangular foamed panels. The panels are abutting one another along horizontal and vertical edges thereof. The concrete-wall formwork further comprises a plurality of said connectors to maintain the formwork sidewalls in spaced and parallel relationship panels, each panel having an inner face facing an inner face of a corresponding panel.

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The connector is characterized in that it comprises :

- a pair of parallel lateral flanges; and
- a central member interconnecting the flanges;

each flange comprising similar tapered lower and upper parts dividing the flange into two symmetrical part, the lower part being slidably engageable in a vertically extending T-shaped slit previously hollowed in a lower panel, the T-shaped slit coming out from an upper edge of the lower panel and having a base section coming out from the inner surface thereof, the upper part of the flange being slidably engageable in a vertically extending T-shaped slit previously hollowed in an upper panel stacked on top of the bottom panel, said T-shaped slit coming out from a lower edge of said upper panel and having a base portion coming out from the inner face of the upper panel. The "-" of the T-shaped slit may have a decreasing thickness from the upper edge of the panel to the inside of the panel.

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The upper part and the lower part of the flanges are each sized to snugly fit in their respective T-shaped slit and they are provided with gripping means for maintaining a tight hold with the surface defining the slit such that once such a part is

engaged in a corresponding T-shaped slit it cannot be removed easily. Preferably, the gripping means comprise a plurality of barbs protruding from the surface of the upper and lower part.

5           The connector preferably further comprises an inner support member associated with each flange, the support member is parallel to the flange and connected therewith by means of a web of a given width sized such that the support member is abutting the inner face of the panel as the flange is engaged in the T-shaped slit thereby strengthening the joint between the panel and the connector.

10           The materials used as constituting material of the flanges and of the central member of the connector may be similar or different. Various material like plastics, steel, other metallic alloys, metals such as aluminium and copper or composite materials can be used, provided they will exhibit a sufficient rigidity and preferably a low thermic conductivity.

15           In the case where a material with a high thermic conductivity would be used for the central member of the connector, then care should be taken that the central member would not go too deep in the foam panel which would generate an unwanted thermic bridge.

20           The lateral flanges are preferably made of plastic and in a first preferred embodiment the central member comprises at least two metal rods each having their opposite ends molded in a corresponding flange. In a second preferred embodiment, the central member comprises a plastic plate having opposites edges molded to the corresponding flange. This second preferred embodiment consist of a single molded connector.

25           In use on the site of construction, a first pair of panels are set parallel in spaced relationship with their inner face facing each other. The lower part of each of the flanges of a first connector is then slidably engaged into a corresponding T-shaped slit coming out from the upper edge of the panel. The depth of the slit in each panel are such that the lower part of the flanges are completely inserted therein.

Then a second pair of panels is stacked on top of the first pair by slidably engaging the upper part of each of the flanges of said first connector in the T-shaped slit coming out from the bottom edge of the corresponding panel. Then further pairs of panels are stacked the same way to obtain the pair of sidewalls defining a formwork for pouring concrete.

The panels used as constitutive parts of the formwork possess a relief on their edges. The relief has a form suited to assure the stability of coplanar embedded panels.

As can be appreciated, the connectors of the invention are easy to manufacture and easily inserted in the preformed slits of the panel. The resulting formworks presents an exceptional rigidity and the isolated panels are strongly attached to the internal concrete wall obtained after hardening of the filling material poured into the cavity existing between the isolating walls.

The constituting elements of the formwork are available in the form of a kit made of the connectors and of the isolating panels with the preformed slits.

The structural elements forming the kit can be easily manufactured, stored and transported on the side. Due to the relatively light weight of the material used for the manufacture of the elements of the kit and due to the fact that these elements of the kit can be packed in a compact form, the freight costs for transportation are significantly reduced.

Other features and objects of the present invention will become more apparent from the description that follows of preferred embodiments, having reference to the appended drawings and given as examples only as to how the invention may be put into practice.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side elevational view of a pair of panels connected with a first preferred embodiment of a connector according to the present invention;

5        Figure 2 is a partial perspective view of the connector shown in figure 1;

Figure 3 is a partial perspective view of a second preferred embodiment of a connector according to the present invention; and

Figure 4 is a top view of a panel showing the T-shaped slit.

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## DESCRIPTION OF PREFERRED EMBODIMENT

Referring to Figure 1, the connector (2) is suitable for use with a concrete-wall  
15        formwork (4) of the type comprising a pair of formwork sidewalls (6). Each sidewall (6) is formed of a plurality of stacked horizontal rows of coplanar substantially rectangular foamed panels (8). The panels (8) are abutting one another along horizontal and vertical edges thereof. A plurality of connectors (2), as shown in Figure 1 are used to maintain the formwork sidewalls (6) in spaced and parallel relationship.

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Referring to Figures 1 and 2, the connector (2) is characterized in that it comprises a pair of parallel lateral flanges (10) and a central member (12) interconnecting the flanges (10). Each flange (10) comprises similar tapered lower and upper parts (14,16) dividing the flange (10) into two symmetrical part. The lower part  
25        (14) and the upper part(16) are each slidably engageable into a respective vertically extending T-shaped slit (18), best shown in Figure 4, previously hollowed in a corresponding panel (8).

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Each of the panels (8) forming the sidewalls (6) comprises a first series of vertically extending T-shaped slit (18) coming out from an upper edge (8a) thereof and having a base section (19) coming out from the inner face (9) of the panel (8), as shown

in Figure 4. Each of the panels (8) further comprises a second series of T-shaped slit coming out from a lower edge (8b) of said upper panel and having a base portion coming out from the inner face of the upper panel. The slits (18) from the first series are each in line with a corresponding slit of the second series. Thereby, the sidewalls (6) of a plastic foam concrete form may be rapidly erected on the site of construction by piling up and securing pairs of panels (8) by simply using a connector (2) such as the one described hereinbefore.

As can be appreciated, the upper and lower part (14,16) of the flanges (10) are tapered to ease their insertion into the T-shaped slit (18). They are also sized to tightly fit in their respective T-shaped slit. Gripping means are provided on each of the lower part (14) and upper part (16) for maintaining a tight hold with the surface defining the slit such that once such a part is engaged in a corresponding T-shaped slit it cannot be removed easily. As illustrated, the gripping means preferably comprises a plurality of barbs (20) protruding from the surface of the upper and lower part (14,16).

The connector (2) preferably further comprises an inner support member (22) associated with each flange (10). The support member (22) is parallel to the flange (10) and connected therewith by means of a plastic web (24) of a given width sized such that the support member (22) is abutting the inner face (9) of the panel (8) as the flange (10) is engaged in the T-shaped slit thereby strengthening the joint between the panel (8) and the connector (2).

The lateral flanges (10) are preferably made of a rigid plastic and in a first preferred embodiment, illustrated in Figure 2, the central member (12) comprises a rigid plastic plate (26) having opposite edges molded to the corresponding flange (10). This second preferred embodiment consists of a single molded connector.

In a further preferred embodiment illustrated in Figure 3, the central member (12) comprises at least two metal rods (28) each having their opposite ends (30) molded in a corresponding flange (10).

In a preferred embodiment according to Figures 1 and 2, the connector (2) is further characterized in that:

- each flange (10) has a diamond shaped form with a double truncation of the triangular shaped upper and lower part (14,16) of the flange (10);
- 5    - the upper and lower parts (14,16) of each flange (10) have a decreasing thickness from the base of their triangular part (14,16) to the truncated end of their triangular part (14,16);
- the barbs (20) protruding from the surface of the upper and lower part (14,16) are made of series of parallel blades with a triangular section; and
- 10   - support members (22) have a triangular truncated form and the size of a support member (22) is about half the size of a flange (10).

Finally when the assemblage of the formwork is completed the empty cavity (31) existing between the side-walls (8) made of isolating and rigid panels is filled with  
15   concrete or with cement based grout.

After hardening of the filling material, a composite wall is obtained with the isolating panels firmly attached through the connectors to the concrete inside-wall.



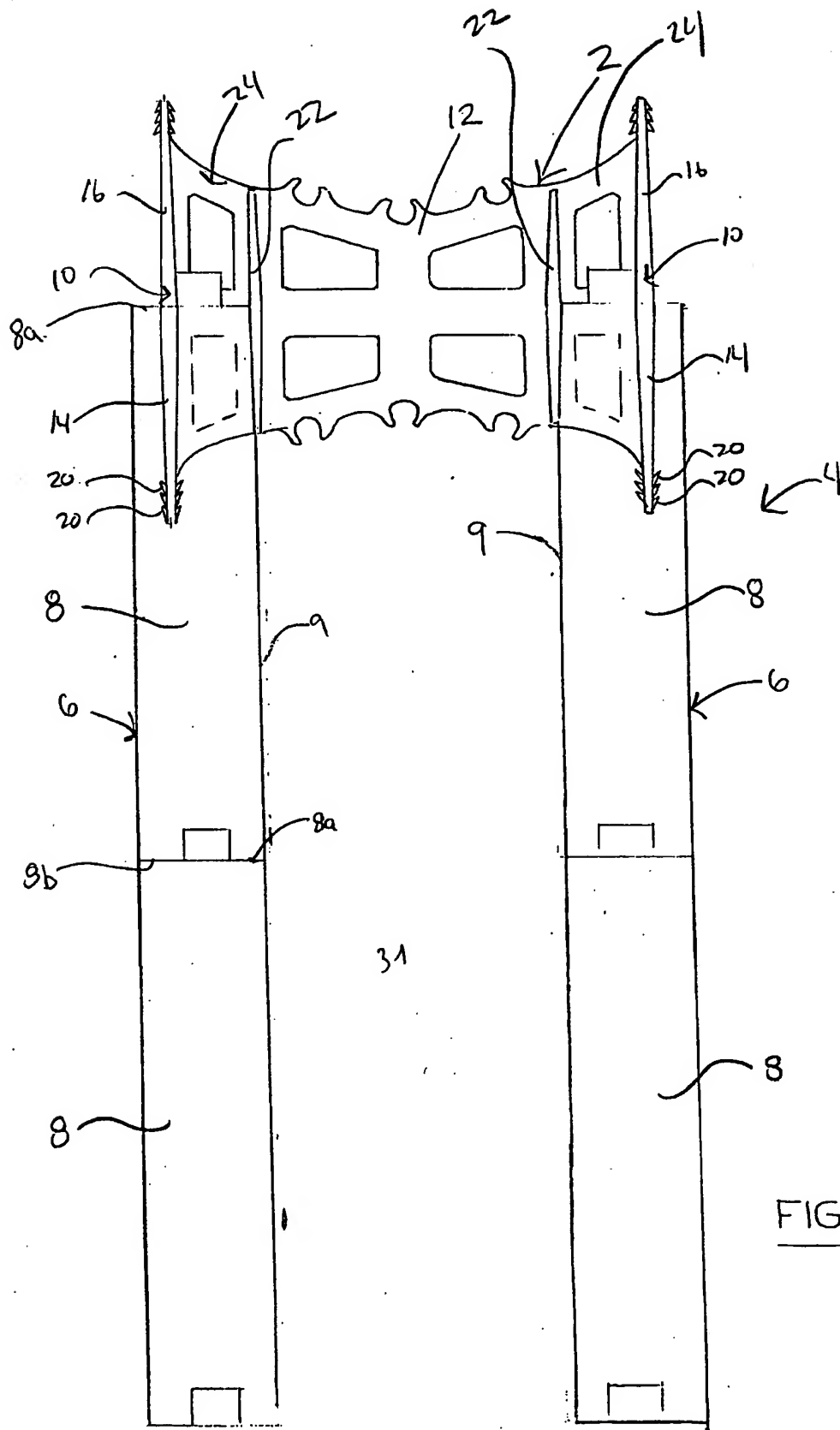


FIG. 1

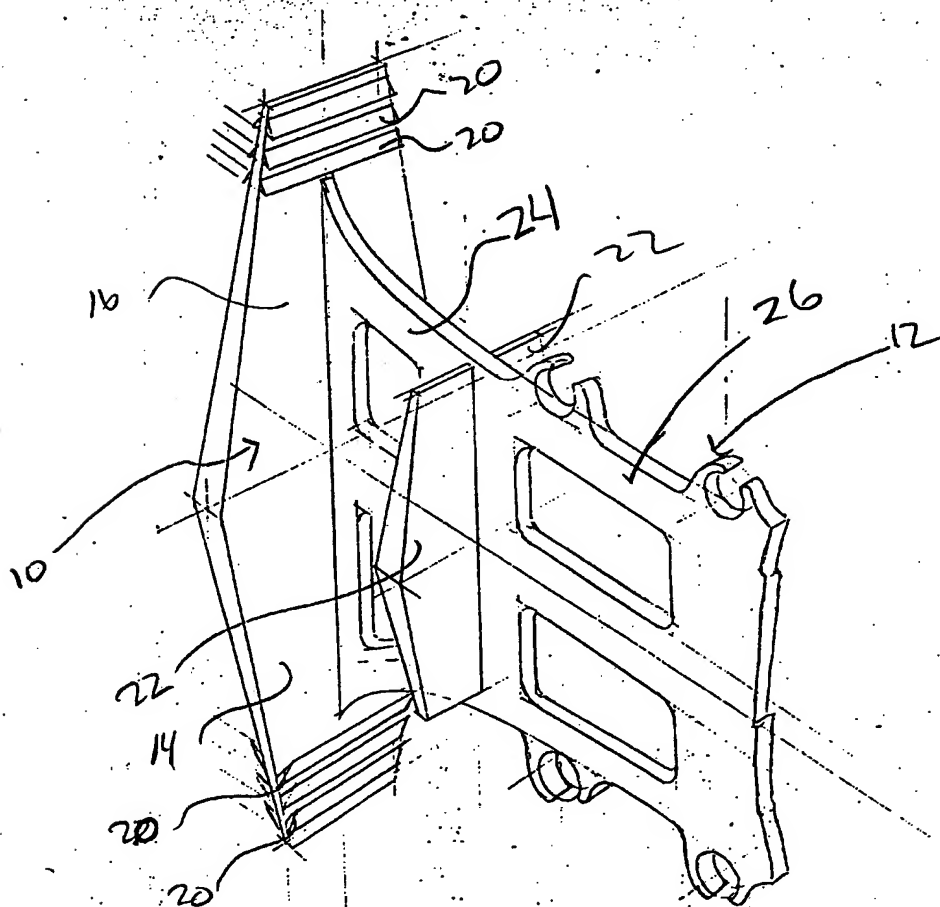
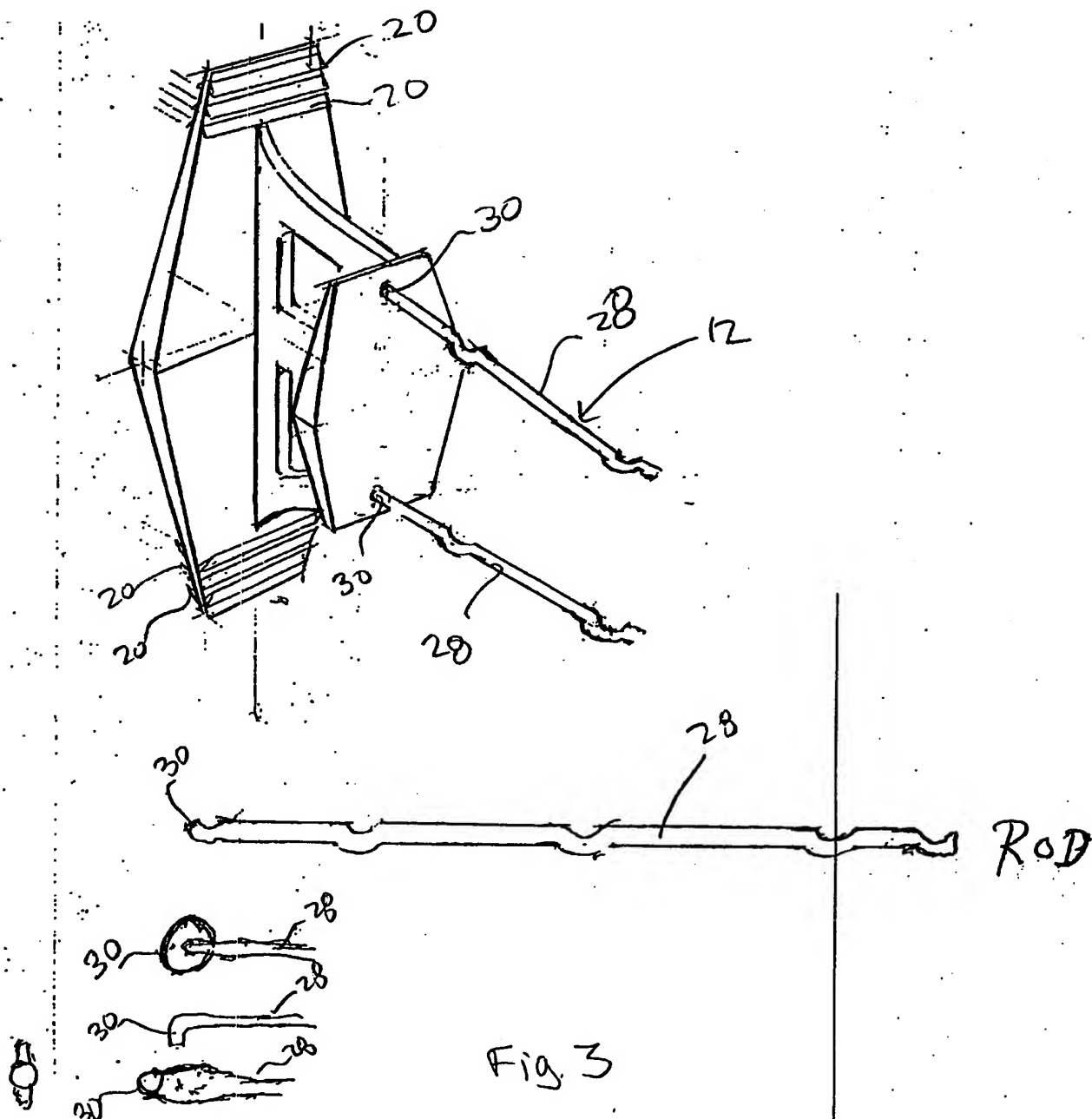
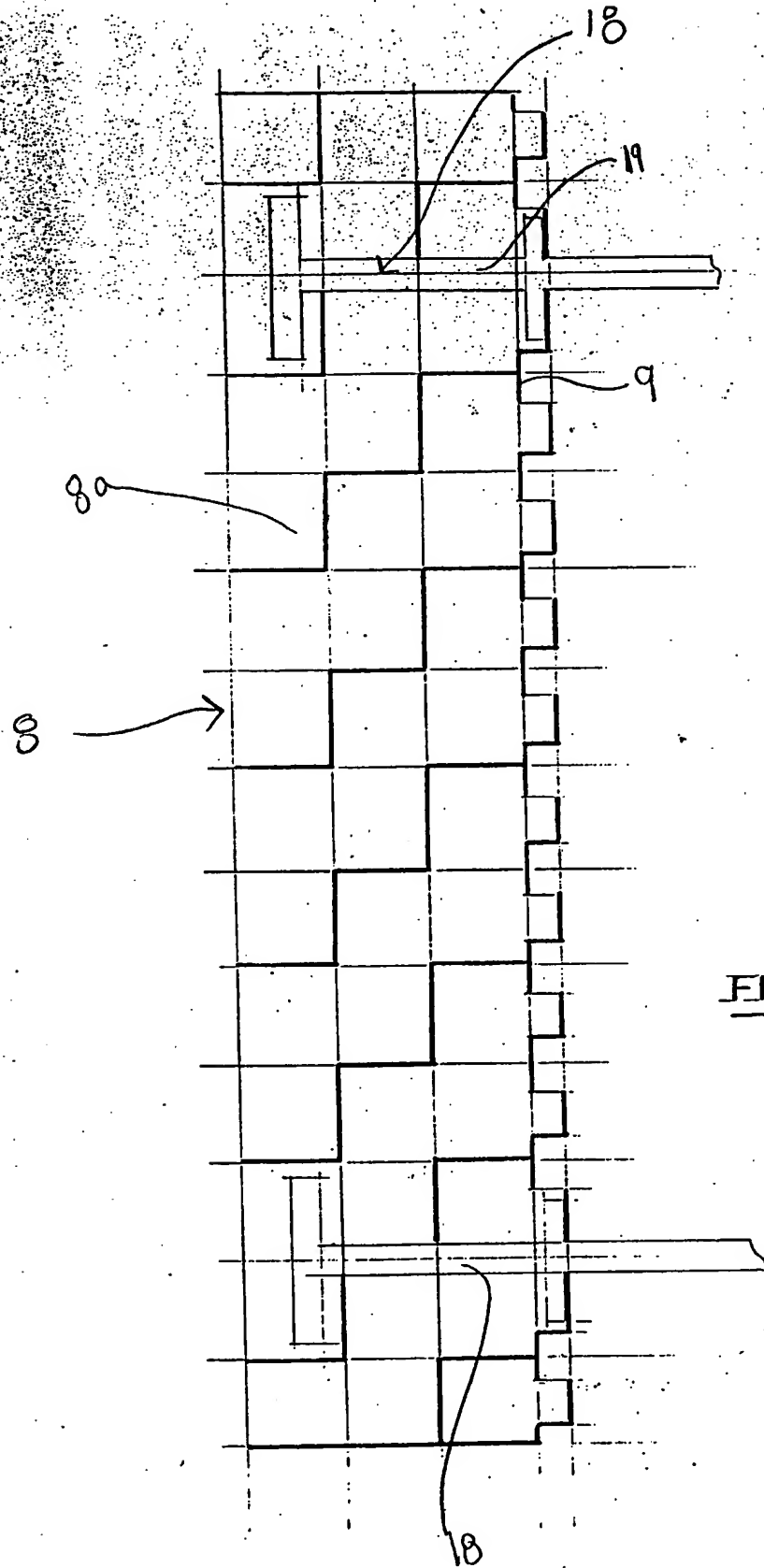


FIG. 2





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FIG. 3